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SEQUENCE LISTING

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<120> GLUTAMATE TRANSPORTER ASSOCIATED PROTEINS AND METHODS OF USE THEREOF

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<211> 7240

<212> DNA

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<220>

<221> CDS

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Gly Gln Tyr Ser Asp Ile Asn Asn Arg Trp Asp Leu Pro Asp Ser Asp
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Trp Asp Asn Asp Ser Ser Ala Arg Leu Phe Glu Arg Ser Arg Ile
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Lys Ala Leu Ala Asp Glu Arg Ala Val Gln Lys Lys Thr Phe Thr
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Val Leu Ser Gly Glu Thr Leu Pro Lys Pro Thr Lys Gly Arg Met Arg
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Gln Lys Val His Leu Glu Asn Met Gly Ser His Asp Ile Val Asp Gly
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Gln Ile Gln Asp Ile Ser Val Glu Thr Glu Asp Asn Lys Glu Lys Lys		
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Ser Ala Lys Asp Ala Leu Leu Trp Cys Gln Met Lys Thr Ala Gly		
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Leu Ala Phe Asn Ala Ile Val His Lys His Arg Pro Asp Leu Leu Asp		
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Ile Glu Gln Thr Ile Gly Thr Phe Asn Asp Arg Gln Leu Ala Asn Ser		
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Lys His Leu Ala Gly Val Glu Asp Leu Leu Gln Leu His Glu Leu Val	
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Ser Ala Leu Arg Phe Cys Asp Pro Gly Lys Glu Tyr Arg Pro Cys Gly	
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Pro Gln Leu Val Ser Glu Arg Val Ala Thr Leu Glu Gln Ser Tyr Glu	
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625 630 635 640	
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770	775	780	
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tcc ctg gca ggt ggc aaa aag gca gct ctg aca tca gcc ctg agc atc Ser Leu Ala Gly Gly Lys Ala Ala Leu Thr Ser Ala Leu Ser Ile 945	950	955	2880
cag aat tac cac cta gag tgc aca gag acc cag gcc tgg atg aga gaa Gln Asn Tyr His Leu Glu Cys Thr Glu Thr Gln Ala Trp Met Arg Glu 965	970	975	2928
aag acc aag gtc att gag tct acc cag gac cta ggc aat gat cta gct Lys Thr Lys Val Ile Glu Ser Thr Gln Asp Leu Gly Asn Asp Leu Ala 980	985	990	2976
ggt gtg ctg gcc ctg cag cgg aag ctg gca ggc act gag aga gat ctg Gly Val Leu Ala Leu Gln Arg Lys Leu Ala Gly Thr Glu Arg Asp Leu 995	1000	1005	3024
gaa gcc atc tct gcc cgg gtg ggt gag ctg acc caa gag gca aat Glu Ala Ile Ser Ala Arg Val Gly Glu Leu Thr Gln Glu Ala Asn 1010	1015	1020	3069
gct ttg gct gct ggg cac cca gcc caa gcc cct gcc atc aac aca Ala Leu Ala Ala Gly His Pro Ala Gln Ala Pro Ala Ile Asn Thr 1025	1030	1035	3114
cg ^g ctt gga gag gtt caa act gga tgg gag gat ctt cg ^g gca acc Arg Leu Gly Glu Val Gln Thr Gly Trp Glu Asp Leu Arg Ala Thr 1040	1045	1050	3159
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Ala Gly	Arg Gln Leu Val Ser	Lys Gly Asn Ile His	Ala Glu Lys	
1235	1240	1245		
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Ile Gln	Glu Lys Ala Asp Ser	Ile Glu Lys Arg His	Arg Lys Asn	
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Gln Glu	Ala Val Gln Gln Leu	Leu Gly Arg Leu Arg	Asp Asn Arg	
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Glu Gln	Gln His Phe Leu Gln	Asp Cys Gln Glu Leu	Lys Leu Trp	
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Ala Arg	Asn Leu His Thr Lys	Trp Gln Lys His Gln	Ala Phe Met	
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gcc gag	ctg gca gcc aac aag	gac tgg ctg gac aaa	gtg gac aag	4014
Ala Glu	Leu Ala Ala Asn Lys	Asp Trp Leu Asp Lys	Val Asp Lys	
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Glu Gly	Arg Glu Leu Thr Leu	Glu Lys Pro Glu Leu	Lys Val Leu	
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Val Ser	Glu Lys Leu Glu Asp	Leu His Arg Arg Trp	Asp Glu Leu	
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Glu Thr	Thr Thr Gln Ala Lys	Ala Arg Ser Leu Phe	Asp Ala Asn	
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Arg Ala	Glu Leu Phe Ala Gln	Ser Cys Ser Ala Leu	Glu Ser Trp	
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ctg gag	agc ctg cag gcc cag	ctg cac tca gat gac	tat ggc aag	4239
Leu Glu	Ser Leu Gln Ala Gln	Leu His Ser Asp Asp	Tyr Gly Lys	
1400	1405	1410		

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Cys	Gln	Pro	Met	Lys	Asp	Arg	Cys	Arg	Arg	Leu	Gln	Ala	Ser	Arg	
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Gln	Lys	Glu	Ile	Gln	Gly	His	Glu	Pro	Arg	Ile	Ala	Asp	Leu	Lys	
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Gln	Ala	Glu	Val	Lys	Lys	His	Gln	Val	Leu	Glu	Gln	Ala	Leu	Ala	
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Asp	Tyr	Ala	Gln	Thr	Ile	Lys	Gln	Leu	Ala	Ala	Ser	Ser	Gln	Asp	
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Gln	Ala	Gln	Val	Asp	Lys	Leu	Tyr	Ala	Gly	Leu	Lys	Glu	Leu	Ala	
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Gly	Glu	Arg	Arg	Glu	Arg	Leu	Gln	Glu	His	Leu	Arg	Leu	Cys	Gln	
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Leu	Arg	Arg	Glu	Leu	Asp	Asp	Leu	Glu	Gln	Trp	Ile	Gln	Glu	Arg	
1700						1705					1710				
gaa	gtc	gtg	gca	gcc	tcc	cat	gaa	ctg	ggc	cag	gac	tat	gag	cat	5184
Glu	Val	Val	Ala	Ala	Ser	His	Glu	Leu	Gly	Gln	Asp	Tyr	Glu	His	
1715						1720					1725				
gtg	act	atg	ctt	cgg	gac	aaa	ttc	cga	gag	ttc	tcc	agg	gac	acc	5229
Val	Thr	Met	Leu	Arg	Asp	Lys	Phe	Arg	Glu	Phe	Ser	Arg	Asp	Thr	
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agc	acc	att	ggc	caa	gag	cgt	gta	gac	agt	gcc	aat	gcc	ctg	gcc	5274
Ser	Thr	Ile	Gly	Gln	Glu	Arg	Val	Asp	Ser	Ala	Asn	Ala	Leu	Ala	
1745						1750					1755				
aat	ggg	ctc	att	gct	ggg	ggc	cat	gct	gca	tgg	gcc	acc	gtg	gcc	5319
Asn	Gly	Leu	Ile	Ala	Gly	Gly	His	Ala	Ala	Trp	Ala	Thr	Val	Ala	
1760						1765					1770				
gag	tgg	aag	gac	agt	ctc	aat	gag	gcc	tgg	gct	gac	ctg	ctg	gag	5364
Glu	Trp	Lys	Asp	Ser	Leu	Asn	Glu	Ala	Trp	Ala	Asp	Leu	Leu	Glu	
1775						1780					1785				
ctg	ctg	gac	aca	aga	ggt	cag	gtg	ctg	gct	gct	gct	tat	gag	ctg	5409
Leu	Leu	Asp	Thr	Arg	Gly	Gln	Val	Leu	Ala	Ala	Ala	Tyr	Glu	Leu	
1790						1795					1800				
cag	cgc	ttc	ctg	cat	ggg	gcc	cgc	caa	gcc	ctg	gca	cgg	gtg	cag	5454
Gln	Arg	Phe	Leu	His	Gly	Ala	Arg	Gln	Ala	Leu	Ala	Arg	Val	Gln	
1805						1810					1815				
cac	aag	cag	cag	cag	ctt	cca	gat	ggg	acg	ggc	cgc	gac	ctc	aat	5499
His	Lys	Gln	Gln	Gln	Leu	Pro	Asp	Gly	Thr	Gly	Arg	Asp	Leu	Asn	
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Ala	Ala	Glu	Ala	Leu	Gln	Arg	Arg	His	Cys	Ala	Tyr	Glu	His	Asp	
1835						1840					1845				
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Ile	Gln	Ala	Leu	Ser	Thr	Gln	Val	Gln	Gln	Val	Gln	Asp	Asp	Gly	
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ctc	agg	cta	caa	aag	gcc	tat	gct	gga	gac	aag	gct	gag	gaa	att	5634
Leu	Arg	Leu	Gln	Lys	Ala	Tyr	Ala	Gly	Asp	Lys	Ala	Glu	Glu	Ile	
1865						1870					1875				
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Gly	Arg	His	Met	Gln	Ala	Val	Ala	Glu	Ala	Trp	Ala	Gln	Leu	Gln	
1880						1885					1890				
gga	agt	tct	gct	gcc	cgt	cgc	cag	ctg	tta	ctg	gat	acc	aca	gac	5724
Gly	Ser	Ser	Ala	Ala	Arg	Arg	Gln	Leu	Leu	Leu	Asp	Thr	Thr	Asp	

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aaa ttc cga ttc ttc aag gct Lys Phe Arg Phe Phe Lys Ala 1910	gtc cg ^g gag ttg atg Val Arg Glu Leu Met 1915	ctg tgg atg Leu Trp Met 1920	5769
gat ggg att aac ctg cag atg Asp Gly Ile Asn Leu Gln Met 1925	gat gcc cag gag agg Asp Ala Gln Glu Arg 1930	ccc cgg gat Pro Arg Asp 1935	5814
gtg tcc tct gca gat tta gtc Val Ser Ser Ala Asp Leu Val 1940	atc aaa aac caa caa Ile Lys Asn Gln Gln 1945	ggc atc aaa Gly Ile Lys 1950	5859
gca gag ata gag gca aga gct Ala Glu Ile Glu Ala Arg Ala 1955	gac agg ttc tcc gcc Asp Arg Phe Ser Ala 1960	tgc att gac Cys Ile Asp 1965	5904
atg ggg caa gag ctg ctg gcc Met Gly Gln Glu Leu Leu Ala 1970	cgg aac cac tat gcc Arg Asn His Tyr Ala 1975	gct gag gag Ala Glu Glu 1980	5949
atc tca gag aag ctg tct cag Ile Ser Glu Lys Leu Ser Gln 1985	cta cag tcc cgg cgc Leu Gln Ser Arg Arg 1990	cag gag aca Gln Glu Thr 1995	5994
gct gaa aag tgg cag gag aag Ala Glu Lys Trp Gln Glu Lys 2000	atg gac tgg cta cag Met Asp Trp Leu Gln 2005	ctt gtt ttg Leu Val Leu 2010	6039
gag gtg ctt gtg ttt ggg aga Glu Val Leu Val Phe Gly Arg 2015	gat gca ggc atg gca Asp Ala Gly Met Ala 2020	gag gcc tgg Glu Ala Trp 2025	6084
cta tgc agt cag gag cca ttg Leu Cys Ser Gln Glu Pro Leu 2030	gtg cga agt gca gaa Val Arg Ser Ala Glu 2035	ctg ggt tgc Leu Gly Cys 2040	6129
act gtg gat gaa gta gag agc Thr Val Asp Glu Val Glu Ser 2045	ctc atc aag cgg cat Leu Ile Lys Arg His 2050	gaa gcc ttc Glu Ala Phe 2055	6174
cag aag tca gca gtg gcc tgg Gln Lys Ser Ala Val Ala Trp 2060	gag gag cgt ttc agt Glu Glu Arg Phe Ser 2065	gcc ctg gag Ala Leu Glu 2070	6219
aag ctc act gcg ctg gaa gag Lys Leu Thr Ala Leu Glu Glu 2075	cgg gag aat gag cag Arg Glu Asn Glu Gln 2080	aaa agg aag Lys Arg Lys 2085	6264
agg gag gag gag gaa cga agg Arg Glu Glu Glu Arg Arg 2090	aaa cag ccc cct act Lys Gln Pro Pro Thr 2095	tca gag ccc Ser Glu Pro 2100	6309
atg gct agt caa ccg gaa ggg Met Ala Ser Gln Pro Glu Gly 2105	agt ctg gta gat ggc Ser Leu Val Asp Gly 2110	cag aga gtt Gln Arg Val 2115	6354
ctt gac act gcc tgg gat ggg Leu Asp Thr Ala Trp Asp Gly 2120	acc cag tca aaa ttg Thr Gln Ser Lys Leu 2125	cca cca tcc Pro Pro Ser 2130	6399
aca caa gca ccc agc att aat Thr Gln Ala Pro Ser Ile Asn 2135	ggg gtc tgc acg gac Gly Val Cys Thr Asp 2140	acg gag tcc Thr Glu Ser 2145	6444

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Ser	Gln	Pro	Leu	Leu	Glu	Gln	Gln	Arg	Leu	Glu	Gln	Ser	Asn	Val	
2150							2155				2160				
cca	gaa	ggg	cct	gga	tct	ggc	aca	gga	gac	gag	tcc	agc	ggg	ccc	6534
Pro	Glu	Gly	Pro	Gly	Ser	Gly	Thr	Gly	Asp	Glu	Ser	Ser	Gly	Pro	
2165							2170				2175				
cgg	gga	gag	agg	cag	acc	ctg	ccc	cgg	ggc	cct	gct	ccg	tct	cca	6579
Arg	Gly	Glu	Arg	Gln	Thr	Leu	Pro	Arg	Gly	Pro	Ala	Pro	Ser	Pro	
2180						2185				2190					
atg	ccc	cag	agc	aga	tcg	tct	gag	tca	gct	cat	gtt	gcc	acc	ctg	6624
Met	Pro	Gln	Ser	Arg	Ser	Ser	Glu	Ser	Ala	His	Val	Ala	Thr	Leu	
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Pro	Ala	Arg	Gly	Ala	Glu	Leu	Ser	Ala	Gln	Glu	Gln	Met	Glu	Gly	
2210						2215					2220				
acg	ctg	tgc	cgc	aaa	cag	gag	atg	gaa	gcc	tcc	aat	aag	aaa	gct	6714
Thr	Leu	Cys	Arg	Lys	Gln	Glu	Met	Glu	Ala	Phe	Asn	Lys	Lys	Ala	
2225						2230					2235				
gcc	aac	agg	tcc	tgg	cag	aat	gtg	tac	tgt	gta	ctt	cgg	cgt	gga	6759
Ala	Asn	Arg	Ser	Trp	Gln	Asn	Val	Tyr	Cys	Val	Leu	Arg	Arg	Gly	
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Ser	Leu	Gly	Phe	Tyr	Lys	Asp	Ala	Arg	Ala	Ala	Ser	Ala	Gly	Val	
2255						2260					2265				
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Pro	Tyr	His	Gly	Glu	Val	Pro	Val	Ser	Leu	Ala	Arg	Ala	Gln	Gly	
2270						2275					2280				
agt	gtg	gcc	ttt	gat	tat	cg	aaa	cgc	aaa	cat	gtc	ttc	aag	ctg	6894
Ser	Val	Ala	Phe	Asp	Tyr	Arg	Lys	Arg	Lys	His	Val	Phe	Lys	Leu	
2285						2290					2295				
ggc	ttg	cag	gat	ggg	aaa	gag	tat	cta	ttc	cag	gcc	aag	gat	gag	6939
Gly	Leu	Gln	Asp	Gly	Lys	Glu	Tyr	Leu	Phe	Gln	Ala	Lys	Asp	Glu	
2300						2305					2310				
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Ala	Glu	Met	Ser	Ser	Trp	Leu	Arg	Val	Val	Asn	Ala	Ala	Ile	Ala	
2315						2320					2325				
act	gcg	tcc	tcg	gcc	tct	gga	gag	cca	gaa	gag	cca	gtg	gtg	ccc	7029
Thr	Ala	Ser	Ser	Ala	Ser	Gly	Glu	Pro	Glu	Glu	Pro	Val	Val	Pro	
2330						2335					2340				
agt	gcc	agc	cgg	ggt	ctg	acc	agg	gcc	atg	acc	atg	ccc	cca	gtg	7074
Ser	Ala	Ser	Arg	Gly	Leu	Thr	Arg	Ala	Met	Thr	Met	Pro	Pro	Val	
2345						2350					2355				
tca	cag	cct	gag	ggc	tcc	atc	gtg	ctt	cgc	agc	aag	gat	ggc	aga	7119
Ser	Gln	Pro	Glu	Gly	Ser	Ile	Val	Leu	Arg	Ser	Lys	Asp	Gly	Arg	
2360						2365					2370				
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Glu	Arg	Glu	Arg	Glu	Lys	Arg	Phe	Ser	Phe	Phe	Lys	Lys	Asn	Lys	
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Gly Gln Tyr Ser Asp Ile Asn Asn Arg Trp Asp Leu Pro Asp Ser Asp
20 25 30

Trp Asp Asn Asp Ser Ser Ala Arg Leu Phe Glu Arg Ser Arg Ile
35 40 45

Lys Ala Leu Ala Asp Glu Arg Glu Ala Val Gln Lys Lys Thr Phe Thr
50 55 60

Lys Trp Val Asn Ser His Leu Ala Arg Val Thr Cys Arg Val Gly Asp
65 70 75 80

Leu Tyr Ser Asp Leu Arg Asp Gly Arg Asn Leu Leu Arg Leu Leu Glu
85 90 95

Val Leu Ser Gly Glu Thr Leu Pro Lys Pro Thr Lys Gly Arg Met Arg
100 105 110

Ile His Cys Leu Glu Asn Val Asp Lys Ala Leu Gln Phe Leu Lys Glu
115 120 125

Gln Lys Val His Leu Glu Asn Met Gly Ser His Asp Ile Val Asp Gly
130 135 140

Asn His Arg Leu Thr Leu Gly Leu Val Trp Thr Ile Ile Leu Arg Phe
145 150 155 160

Gln Ile Gln Asp Ile Ser Val Glu Thr Glu Asp Asn Lys Glu Lys Lys
165 170 175

Ser Ala Lys Asp Ala Leu Leu Trp Cys Gln Met Lys Thr Ala Gly
180 185 190

Tyr Pro Asn Val Asn Val His Asn Phe Thr Thr Ser Trp Arg Asp Gly
195 200 205

Leu Ala Phe Asn Ala Ile Val His Lys His Arg Pro Asp Leu Leu Asp

210

215

220

Phe Glu Ser Leu Lys Lys Cys Asn Ala His Tyr Asn Leu Gln Asn Ala
225 230 235 240

Phe Asn Leu Ala Glu Lys Glu Leu Gly Leu Thr Lys Leu Leu Asp Pro
245 250 255

Glu Asp Val Asn Val Asp Gln Pro Asp Glu Lys Ser Ile Ile Thr Tyr
260 265 270

Val Ala Thr Tyr Tyr His Tyr Phe Ser Lys Met Lys Ala Leu Ala Val
275 280 285

Glu Gly Lys Arg Ile Gly Lys Val Leu Asp His Ala Met Glu Ala Glu
290 295 300

His Leu Val Glu Lys Tyr Glu Ser Leu Ala Ser Glu Leu Leu Gln Trp
305 310 315 320

Ile Glu Gln Thr Ile Gly Thr Phe Asn Asp Arg Gln Leu Ala Asn Ser
325 330 335

Leu Ser Gly Val Gln Asn Gln Leu Gln Ser Phe Asn Ser Tyr Arg Thr
340 345 350

Val Glu Lys Pro Pro Lys Phe Thr Glu Lys Gly Asn Leu Glu Val Leu
355 360 365

Leu Phe Thr Ile Gln Ser Lys Leu Arg Ala Asn Asn Gln Lys Val Tyr
370 375 380

Thr Pro Arg Glu Gly Arg Leu Ile Ser Asp Ile Asn Lys Ala Trp Glu
385 390 395 400

Arg Leu Glu Lys Ala Glu His Glu Arg Glu Leu Ala Leu Arg Thr Glu
405 410 415

Leu Ile Arg Gln Glu Lys Leu Glu Gln Leu Ala Ala Arg Phe Asp Arg
420 425 430

Lys Ala Ala Met Arg Glu Thr Trp Leu Ser Glu Asn Gln Arg Leu Val
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Ser Gln Asp Asn Phe Gly Leu Glu Leu Ala Ala Val Glu Ala Ala Val
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Arg Lys His Glu Ala Ile Glu Thr Asp Ile Val Ala Tyr Ser Gly Arg
465 470 475 480

Val Gln Ala Val Asp Ala Val Ala Ala Glu Leu Ala Ala Glu His Tyr
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His Asp Ile Lys Arg Ile Ala Ala Arg Gln Asn Asn Val Ala Arg Leu
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Trp Asp Phe Leu Arg Glu Met Val Ala Ala Arg Arg Glu Arg Leu Leu
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Leu Asn Leu Glu Leu Gln Lys Val Phe Gln Asp Leu Leu Tyr Leu Met
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Asp Trp Met Ala Glu Met Lys Gly Arg Leu Gln Ser Gln Asp Leu Gly
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Lys His Leu Ala Gly Val Glu Asp Leu Leu Gln Leu His Glu Leu Val
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Glu Ala Asp Ile Ala Val Gln Ala Glu Arg Val Arg Ala Val Ser Ala
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Ser Ala Leu Arg Phe Cys Asp Pro Gly Lys Glu Tyr Arg Pro Cys Gly
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Pro Gln Leu Val Ser Glu Arg Val Ala Thr Leu Glu Gln Ser Tyr Glu
610 615 620

Ala Leu Cys Glu Leu Ala Ala Thr Arg Arg Ala Arg Leu Glu Glu Ser
625 630 635 640

Arg Arg Leu Trp Arg Phe Leu Trp Glu Val Gly Glu Ala Glu Ala Trp
645 650 655

Val Arg Glu Gln Gln His Leu Leu Ala Ser Ala Glu Thr Gly Arg Asp
660 665 670

Leu Thr Gly Val Leu Arg Leu Leu Asn Lys His Thr Ala Leu Arg Gly
675 680 685

Glu Met Ser Gly Arg Leu Gly Pro Leu Lys Leu Thr Leu Glu Gln Gly
690 695 700

Gln Gln Leu Val Ala Glu Gly His Pro Gly Ala Asn Gln Ala Ser Thr
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Arg Ala Ala Glu Leu Gln Ala Gln Trp Glu Arg Leu Glu Ala Leu Ala
725 730 735

Glu Glu Arg Ala Gln Arg Leu Ala Gln Ala Ala Ser Leu Tyr Gln Phe
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Leu Val Ser Ser Pro Glu Val Gly His Asp Glu Phe Ser Thr Gln Ala
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850 855 860

Gly Leu Trp Val Glu Glu Lys Glu Gln Trp Leu Asn Gly Leu Ala Leu
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Pro Glu Arg Leu Glu Asp Pro Glu Val Val Gln Gln Arg Phe Glu Thr
885 890 895

Leu Glu Pro Glu Met Asn Ala Leu Ala Ala Arg Ile Thr Ala Val Ser
900 905 910

Asp Ile Ala Glu Gln Leu Leu Lys Ala Ser Pro Pro Gly Lys Asp Arg
915 920 925

Ile Ile Gly Thr Gln Glu Gln Leu Asn Gln Arg Trp Gln Gln Phe Arg
930 935 940

Ser Leu Ala Gly Gly Lys Lys Ala Ala Leu Thr Ser Ala Leu Ser Ile
945 950 955 960

Gln Asn Tyr His Leu Glu Cys Thr Glu Thr Gln Ala Trp Met Arg Glu
965 970 975

Lys Thr Lys Val Ile Glu Ser Thr Gln Asp Leu Gly Asn Asp Leu Ala
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Gly Val Leu Ala Leu Gln Arg Lys Leu Ala Gly Thr Glu Arg Asp Leu
995 1000 1005

Glu Ala Ile Ser Ala Arg Val Gly Glu Leu Thr Gln Glu Ala Asn
1010 1015 1020

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Val Glu Arg Ala Gln Ser Glu Tyr Ser Arg Leu Arg Thr Leu Gly
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Glu Glu Val Thr Arg Asp Gln Ala Asp Pro Gln Cys Leu Phe Leu
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Ser Ser Gln Glu Tyr Val Leu Ser His Thr Glu Met Pro Gly Thr
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Ala Gly Arg Gln Leu Val Ser Lys Gly Asn Ile His Ala Glu Lys

1235

1240

1245

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Val Ser Glu Lys Leu Glu Asp Leu His Arg Arg Trp Asp Glu Leu
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Glu Thr Thr Thr Gln Ala Lys Ala Arg Ser Leu Phe Asp Ala Asn
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Leu Glu Ser Leu Gln Ala Gln Leu His Ser Asp Asp Tyr Gly Lys
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Asp Leu Thr Ser Val Asn Ile Leu Leu Lys Lys Gln Gln Met Leu
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Val Glu Arg Thr Ser Arg Ala Val Glu Glu Lys Phe Arg Ala Leu
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Gln Lys Glu Ile Gln Gly His Glu Pro Arg Ile Ala Asp Leu Lys
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Glu Arg Gln Arg Thr Leu Arg Thr Ala Ala Ala Gly Pro Glu Leu
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Asp Tyr Ala Gln Thr Ile Lys Gln Leu Ala Ala Ser Ser Gln Asp
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Met Ile Asp His Glu His Pro Glu Ser Thr Arg Leu Thr Ile Arg
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Val Thr Met Leu Arg Asp Lys Phe Arg Glu Phe Ser Arg Asp Thr
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His Lys Gln Gln Gln Leu Pro Asp Gly Thr Gly Arg Asp Leu Asn
1820 1825 1830

Ala Ala Glu Ala Leu Gln Arg Arg His Cys Ala Tyr Glu His Asp
1835 1840 1845

Ile Gln Ala Leu Ser Thr Gln Val Gln Gln Val Gln Asp Asp Gly
1850 1855 1860

Leu Arg Leu Gln Lys Ala Tyr Ala Gly Asp Lys Ala Glu Glu Ile
1865 1870 1875

Gly Arg His Met Gln Ala Val Ala Glu Ala Trp Ala Gln Leu Gln
1880 1885 1890

Gly Ser Ser Ala Ala Arg Arg Gln Leu Leu Leu Asp Thr Thr Asp
1895 1900 1905

Lys Phe Arg Phe Phe Lys Ala Val Arg Glu Leu Met Leu Trp Met
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Asp Gly Ile Asn Leu Gln Met Asp Ala Gln Glu Arg Pro Arg Asp
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Val Ser Ser Ala Asp Leu Val Ile Lys Asn Gln Gln Gly Ile Lys
1940 1945 1950

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2215

2220

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Pro Tyr His Gly Glu Val Pro Val Ser Leu Ala Arg Ala Gln Gly
2270 2275 2280

Ser Val Ala Phe Asp Tyr Arg Lys Arg Lys His Val Phe Lys Leu
2285 2290 2295

Gly Leu Gln Asp Gly Lys Glu Tyr Leu Phe Gln Ala Lys Asp Glu
2300 2305 2310

Ala Glu Met Ser Ser Trp Leu Arg Val Val Asn Ala Ala Ile Ala
2315 2320 2325

Thr Ala Ser Ser Ala Ser Gly Glu Pro Glu Glu Pro Val Val Pro
2330 2335 2340

Ser Ala Ser Arg Gly Leu Thr Arg Ala Met Thr Met Pro Pro Val
2345 2350 2355

Ser Gln Pro Glu Gly Ser Ile Val Leu Arg Ser Lys Asp Gly Arg
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Glu Arg Glu Arg Glu Lys Arg Phe Ser Phe Phe Lys Lys Asn Lys
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48

cag tct cac ctg tcc agt ccc att gca tcc tgg tta agt agc ctg tct
Gln Ser His Leu Ser Ser Pro Ile Ala Ser Trp Leu Ser Ser Leu Ser
20 25 30

96

tct ctg gga gat tct aca cct gaa cgc aca tcc cct tct cac cac cgc Ser Leu Gly Asp Ser Thr Pro Glu Arg Thr Ser Pro Ser His His Arg 35 40 45	144
cag ccc tct gac act tct gag aca aca gca ggt ctt gtt cag cgc tgt Gln Pro Ser Asp Thr Ser Glu Thr Thr Ala Gly Leu Val Gln Arg Cys 50 55 60	192
gtc atc atc caa aag gac cag cat ggc ttt ggc ttc aca gtt agt gga Val Ile Ile Gln Lys Asp Gln His Gly Phe Gly Phe Thr Val Ser Gly 65 70 75 80	240
gat cgc att gta ctg gtg cag tcc gtg cgc cct gga ggc gca gcc atg Asp Arg Ile Val Leu Val Gln Ser Val Arg Pro Gly Gly Ala Ala Met 85 90 95	288
aaa gct ggt gtg aaa gag ggt gac cgg atc atc aaa gta aac ggc acc Lys Ala Gly Val Lys Glu Gly Asp Arg Ile Ile Lys Val Asn Gly Thr 100 105 110	336
atg gtg acc aat agc tca cac ctg gag gtg gta aag ctt atc aaa tct Met Val Thr Asn Ser Ser His Leu Glu Val Val Lys Leu Ile Lys Ser 115 120 125	384
ggc gcc tat gct gcg ctt acc ctc cta ggc tct tct cct ccc tcc gtc Gly Ala Tyr Ala Ala Leu Thr Leu Leu Gly Ser Ser Pro Pro Ser Val 130 135 140	432
ggc gtc tct ggg ctc cag cag aat cca tct gtg gca gga gtg ctc aga Gly Val Ser Gly Leu Gln Gln Asn Pro Ser Val Ala Gly Val Leu Arg 145 150 155 160	480
gtt aac ccc atc att cct cca cca cct ccc ccg cca ccc ttg cca cct Val Asn Pro Ile Ile Pro Pro Pro Pro Pro Pro Pro Leu Pro Pro 165 170 175	528
cca cag cac att act gga ccc aaa cct ctt cag gat cct gaa gtc caa Pro Gln His Ile Thr Gly Pro Lys Pro Leu Gln Asp Pro Glu Val Gln 180 185 190	576
aag cac gcc actcaa atc ctc tgg aat atg cta aga cag gag gag gaa Lys His Ala Thr Gln Ile Leu Trp Asn Met Leu Arg Gln Glu Glu Glu 195 200 205	624
gag tta cag gac ata ctt cca ccc tgt ggt gag acc agt cag aga aca Glu Leu Gln Asp Ile Leu Pro Pro Cys Gly Glu Thr Ser Gln Arg Thr 210 215 220	672
tgt gag ggc cgc ctc tct gtg gac tcc cag gag gca gac agt ggc ttg Cys Glu Gly Arg Leu Ser Val Asp Ser Gln Glu Ala Asp Ser Gly Leu 225 230 235 240	720
gat tct ggg aca gaa cgc ttt ccc tcc atc agt gag tca ttg atg aat Asp Ser Gly Thr Glu Arg Phe Pro Ser Ile Ser Glu Ser Leu Met Asn 245 250 255	768
cgg aac tca gta ttg tca gat cct gga cta gac agc cct caa acc tcc Arg Asn Ser Val Leu Ser Asp Pro Gly Leu Asp Ser Pro Gln Thr Ser 260 265 270	816
cct gta atc ctg gcc agg gtg gcc cag cac cac agg cga cag ggc tca Pro Val Ile Leu Ala Arg Val Ala Gln His His Arg Arg Gln Gly Ser 275 280 285	864
gat gca gcg ttg ctc ccg ctc aac cac cag ggt ata gat caa agc cca	912

Asp Ala Ala Leu Leu Pro Leu Asn His Gln Gly Ile Asp Gln Ser Pro			
290	295	300	
aag cct ctg att att ggc cca gag gaa gat tat gac cca ggt tat ttc			960
Lys Pro Leu Ile Ile Gly Pro Glu Glu Asp Tyr Asp Pro Gly Tyr Phe			
305	310	315	320
aac aat gag agt gac atc atc ttc caa gat ctt gaa aaa ctg aag tca			1008
Asn Asn Glu Ser Asp Ile Ile Phe Gln Asp Leu Glu Lys Leu Lys Ser			
325	330	335	
cat cca gct tac ttg gta gtt ttt cta cgt tac atc ctc tct cag gca			1056
His Pro Ala Tyr Leu Val Val Phe Leu Arg Tyr Ile Leu Ser Gln Ala			
340	345	350	
gac cct ggc ccc ctg ctt ttt tat ttg tgt tca gaa gtt tat caa cag			1104
Asp Pro Gly Pro Leu Leu Phe Tyr Leu Cys Ser Glu Val Tyr Gln Gln			
355	360	365	
aca aat ccc aaa gat tcc cga agt ctg ggg aaa gac atc tgg aac att			1152
Thr Asn Pro Lys Asp Ser Arg Ser Leu Gly Lys Asp Ile Trp Asn Ile			
370	375	380	
ttc ctg gag aaa aat gcg cct ctc aga gtg aag atc cct gag atg ttg			1200
Phe Leu Glu Lys Asn Ala Pro Leu Arg Val Lys Ile Pro Glu Met Leu			
385	390	395	400
cag gct gaa att gac cta cgc ctg cgg aac aat gag gac cct cgc aat			1248
Gln Ala Glu Ile Asp Leu Arg Leu Arg Asn Asn Glu Asp Pro Arg Asn			
405	410	415	
gtg ctc tgt gaa gct cag gag gca gtc atg ctg gaa atc cag gag cag			1296
Val Leu Cys Glu Ala Gln Glu Ala Val Met Leu Glu Ile Gln Glu Gln			
420	425	430	
atc aac gac tac aga tcc aag cgt act ctg ggc ctg ggc agc ctc tat			1344
Ile Asn Asp Tyr Arg Ser Lys Arg Thr Leu Gly Leu Gly Ser Leu Tyr			
435	440	445	
ggt gaa aat gac ctg cta ggc ctg gat ggg gac cct ctt cga gaa cgc			1392
Gly Glu Asn Asp Leu Leu Gly Leu Asp Gly Asp Pro Leu Arg Glu Arg			
450	455	460	
caa atg gct gag aag cag ctg gct gcc ctt gga gat atc ttg tcc aaa			1440
Gln Met Ala Glu Lys Gln Leu Ala Ala Leu Gly Asp Ile Leu Ser Lys			
465	470	475	480
tat gag gaa gat cgg agt gcc ccc atg gac ttt gct gtt aat acc ttt			1488
Tyr Glu Glu Asp Arg Ser Ala Pro Met Asp Phe Ala Val Asn Thr Phe			
485	490	495	
atg agc cac gct ggg atc cgt ctt cgg gag tct cga tcc tcc tgc acg			1536
Met Ser His Ala Gly Ile Arg Leu Arg Glu Ser Arg Ser Ser Cys Thr			
500	505	510	
gca gaa aag acc cag tct gcc cct gac aag gac aag tgg ctg ccc ttc			1584
Ala Glu Lys Thr Gln Ser Ala Pro Asp Lys Asp Lys Trp Leu Pro Phe			
515	520	525	
ttc cct aag acc aag aag cag agc agc aat tcc aag aaa gaa aag gat			1632
Phe Pro Lys Thr Lys Lys Gln Ser Ser Asn Ser Lys Lys Glu Lys Asp			
530	535	540	
gcc ttg gag gac aag aag cga aac ccc atc ctc aga tat att ggg aag			1680
Ala Leu Glu Asp Lys Lys Arg Asn Pro Ile Leu Arg Tyr Ile Gly Lys			

545	550	555	560	
ccc aag agc tcc tct cag agc att aag cca ggc aat gtg agg aac atc Pro Lys Ser Ser Ser Gln Ser Ile Lys Pro Gly Asn Val Arg Asn Ile 565		570	575	1728
att cag cac ttt gag aac agc cat cag tat gat gtc cca gag ccg ggg Ile Gln His Phe Glu Asn Ser His Gln Tyr Asp Val Pro Glu Pro Gly 580	585		590	1776
aca caa cga ctc tca aca gga agc ttt cct gag gac ctg ctg gag agt Thr Gln Arg Leu Ser Thr Gly Ser Phe Pro Glu Asp Leu Leu Glu Ser 595	600		605	1824
gac agt tcg cgc tca gag att cga ctg ggc cgc tct ggg agc ctc aag Asp Ser Ser Arg Ser Glu Ile Arg Leu Gly Arg Ser Gly Ser Leu Lys 610	615	620		1872
ggc cg ^g gaa gag atg aag cga tcc cgg aaa gca gag aac gtg ccc cg ^g Gly Arg Glu Glu Met Lys Arg Ser Arg Lys Ala Glu Asn Val Pro Arg 625	630	635	640	1920
cct cga agt gac gtt gac atg gat gct gct gca gag gct gcc cgc ctt Pro Arg Ser Asp Val Asp Met Asp Ala Ala Ala Glu Ala Ala Arg Leu 645	650		655	1968
cac cag tca gcc tcg tcc tct gcc tcc agc ctc tcc acc agg tct ctt His Gln Ser Ala Ser Ser Ala Ser Ser Leu Ser Thr Arg Ser Leu 660	665		670	2016
gag aac cca acc cct ccc ttc acc ccc aaa atg ggc cgc agg agc att Glu Asn Pro Thr Pro Phe Thr Pro Lys Met Gly Arg Arg Ser Ile 675	680		685	2064
gag tcc ccc aat ctg ggg ttc tgt aca gac gtc atc ctt ccc cac ctc Glu Ser Pro Asn Leu Gly Phe Cys Thr Asp Val Ile Leu Pro His Leu 690	695	700		2112
ctg gag gat gat ctg ggc caa ttg tct gac ctg gag cca gag cca gag Leu Glu Asp Asp Leu Gly Gln Leu Ser Asp Leu Glu Pro Glu Pro Glu 705	710	715	720	2160
gtc caa aac tgg cag cat aca gta ggc aag gat gtg gtg gcc aac ctg Val Gln Asn Trp Gln His Thr Val Gly Lys Asp Val Val Ala Asn Leu 725	730		735	2208
acc cag agg gaa att gac cgg caa gag gtc atc aat gag ctt ttt gtg Thr Gln Arg Glu Ile Asp Arg Gln Glu Val Ile Asn Glu Leu Phe Val 740	745		750	2256
aca gaa gca tct cac ctg cgc aca ctc cga gtc ctg gac ctc atc ttc Thr Glu Ala Ser His Leu Arg Thr Leu Arg Val Leu Asp Leu Ile Phe 755	760		765	2304
tac cag cgc atg aga aag gag aac cta atg cct cgg gaa gag cta gcg Tyr Gln Arg Met Arg Lys Glu Asn Leu Met Pro Arg Glu Glu Leu Ala 770	775		780	2352
cg ^g ctc ttc cct aac ctg cct gag ctc ata gag att cac aat tcc tgg Arg Leu Phe Pro Asn Leu Pro Glu Leu Ile Glu Ile His Asn Ser Trp 785	790	795	800	2400
tgt gag gcc atg aag aag ctc cgg gag gag ggc ccc att atc aga gac Cys Glu Ala Met Lys Lys Leu Arg Glu Glu Gly Pro Ile Ile Arg Asp 805	810		815	2448

atc agt gac ccc atg ctg gct cggttt gat ggt cct gcc cga gaa gaa Ile Ser Asp Pro Met Leu Ala Arg Phe Asp Gly Pro Ala Arg Glu Glu	2496
820 825 830	
ctc cag caa gta gct gca caa ttctgt tcc tat cag tca gta gcc cta Leu Gln Val Ala Ala Gln Phe Cys Ser Tyr Gln Ser Val Ala Leu	2544
835 840 845	
gag cta atc agg act aag caa cgt aag gag agt cggttc cag ctc ttcc Glu Leu Ile Arg Thr Lys Gln Arg Lys Glu Ser Arg Phe Gln Leu Phe	2592
850 855 860	
atg cag gag gct gag agc cac cct cag tgc cggtctg cag ctc cga Met Gln Glu Ala Glu Ser His Pro Gln Cys Arg Arg Leu Gln Leu Arg	2640
865 870 875 880	
gac ctc atc gtc tct gaa atg caa cgg ctc acc aag tac cca ctg ctg Asp Leu Ile Val Ser Glu Met Gln Arg Leu Thr Lys Tyr Pro Leu Leu	2688
885 890 895	
cta gag aac atc atc aag cac aca gag ggt ggc acc tct gag cat gag Leu Glu Asn Ile Ile Lys His Thr Glu Gly Gly Thr Ser Glu His Glu	2736
900 905 910	
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915 920 925	
aat gaa gca gta aag cag aca gag aac cgc cac cgg cta gag ggg tac Asn Glu Ala Val Lys Gln Thr Glu Asn Arg His Arg Leu Glu Gly Tyr	2832
930 935 940	
cag aaa cgc ctg gat gcc act gcc cta gag cgg gcc agc aac ccc ttg Gln Lys Arg Leu Asp Ala Thr Ala Leu Glu Arg Ala Ser Asn Pro Leu	2880
945 950 955 960	
gca gca gag ttc aag agc ctg gat ctt aca aca agg aag atg atc cac Ala Ala Glu Phe Lys Ser Leu Asp Leu Thr Thr Arg Lys Met Ile His	2928
965 970 975	
gag ggg cct ctg acc tgg agg atc agc aaa gac aag acc ctg gac ctc Glu Gly Pro Leu Thr Trp Arg Ile Ser Lys Asp Lys Thr Leu Asp Leu	2976
980 985 990	
cag gtg ctt ctg ctt gag gac ctg gtg gta ctg ctg cag aga caa gag Gln Val Leu Leu Leu Glu Asp Leu Val Val Leu Leu Gln Arg Gln Glu	3024
995 1000 1005	
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1010 1015 1020	
tcc gac agc aag cag acg ttca agc cct gtg ctg aag ctc aat gct Ser Asp Ser Lys Gln Thr Phe Ser Pro Val Leu Lys Leu Asn Ala	3114
1025 1030 1035	
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1040 1045 1050	
atc tgc acc tcc gag ctg ggc cct ccc cag atc tat gag ctg gtt Ile Cys Thr Ser Glu Leu Gly Pro Pro Gln Ile Tyr Glu Leu Val	3204
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gca ttg	acg tca tca gac aag	aat ata tgg atg gag	ctc tta gaa	3249
Ala Leu	Thr Ser Ser Asp Lys	Asn Ile Trp Met Glu	Leu Leu Glu	
1070	1075	1080		
gag gcc	gtg cag aat gcc acc	aag cac cct gga gct	gcc cca atc	3294
Glu Ala	Val Gln Asn Ala Thr	Lys His Pro Gly Ala	Ala Pro Ile	
1085	1090	1095		
ccc atc	cat ccc tca cca cca	gga tcc cag gag ccg	gcc tac cag	3339
Pro Ile	His Pro Ser Pro Pro	Gly Ser Gln Glu Pro	Ala Tyr Gln	
1100	1105	1110		
ggc tcc	acc tcc agc agg gta	gaa ata aat gac tca	gaa gta tat	3384
Gly Ser	Thr Ser Ser Arg Val	Glu Ile Asn Asp Ser	Glu Val Tyr	
1115	1120	1125		
cac act	gaa aaa gaa ccc aag	aag cta cct gaa ggc	ccc ggg cct	3429
His Thr	Glu Lys Glu Pro Lys	Lys Leu Pro Glu Gly	Pro Gly Pro	
1130	1135	1140		
gag cag	aga gtt caa gac aag	cag ctg ata gca caa	ggg gag cct	3474
Glu Gln	Arg Val Gln Asp Lys	Gln Leu Ile Ala Gln	Gly Glu Pro	
1145	1150	1155		
gtg cag	gaa gag gat gaa gag	gaa ttg agg acc ttg	cct cga gct	3519
Val Gln	Glu Glu Asp Glu Glu	Glu Leu Arg Thr Leu	Pro Arg Ala	
1160	1165	1170		
ccc ccc	tcc ctg gat gga gaa	aac aga ggc atc agg	aca agg gac	3564
Pro Pro	Ser Leu Asp Gly Glu	Asn Arg Gly Ile Arg	Thr Arg Asp	
1175	1180	1185		
cct gtc	ctt ctg gcc ctc aca	ggc cct ctg ctc atg	gag gga ctt	3609
Pro Val	Leu Leu Ala Leu Thr	Gly Pro Leu Leu Met	Glu Gly Leu	
1190	1195	1200		
gct gat	gct gcc ctg gaa gat	gtg gag aac ttg cgt	cac ctg atc	3654
Ala Asp	Ala Ala Leu Glu Asp	Val Glu Asn Leu Arg	His Leu Ile	
1205	1210	1215		
ctg tgg	agc ctg ctg cct ggt	cac act gtg aag act	cag gct gct	3699
Leu Trp	Ser Leu Leu Pro Gly	His Thr Val Lys Thr	Gln Ala Ala	
1220	1225	1230		
ggc gag	cct gag gat gac ctc	aca ccc acc cct tct	gtc gtg agc	3744
Gly Glu	Pro Glu Asp Asp Leu	Thr Pro Thr Pro Ser	Val Val Ser	
1235	1240	1245		
atc acc	tct cac ccc tgg gac	cca ggg tcc cca ggg	caa gct ccc	3789
Ile Thr	Ser His Pro Trp Asp	Pro Gly Ser Pro Gly	Gln Ala Pro	
1250	1255	1260		
acc ata	agt gac agc acc cga	ctt gcg agg cca gag	ggc agc cag	3834
Thr Ile	Ser Asp Ser Thr Arg	Leu Ala Arg Pro Glu	Gly Ser Gln	
1265	1270	1275		
cca gag	ggc gag gat gtt gct	gtc agt tct ctg gca	cac ctg ccg	3879
Pro Glu	Gly Glu Asp Val Ala	Val Ser Ser Leu Ala	His Leu Pro	
1280	1285	1290		
cca agg	acc aga agt tct ggc	gtc tgg gac tct cct	gag ctg gat	3924
Pro Arg	Thr Arg Ser Ser Gly	Val Trp Asp Ser Pro	Glu Leu Asp	
1295	1300	1305		
agg aat	ccg gct gca gag gct	gca agc aca gaa cca	gca gca agt	3969

Arg	Asn	Pro	Ala	Ala	Glu	Ala	Ala	Ser	Thr	Glu	Pro	Ala	Ala	Ser	
1310						1315					1320				
tac	aag	gtt	gtg	aga	aaa	gtc	tct	cta	ctc	cct	ggt	ggt	ggt	gtc	4014
Tyr	Lys	Val	Val	Arg	Lys	Val	Ser	Leu	Leu	Pro	Gly	Gly	Gly	Val	
1325						1330					1335				
ggt	gca	gcc	aag	gtg	gcg	ggc	agc	aat	gct	atc	cct	gac	agt	ggc	4059
Gly	Ala	Ala	Lys	Val	Ala	Gly	Ser	Asn	Ala	Ile	Pro	Asp	Ser	Gly	
1340						1345					1350				
cag	tca	gaa	tct	gag	cta	tct	gaa	gtg	gaa	ggc	gga	gca	cag	gct	4104
Gln	Ser	Glu	Ser	Glu	Leu	Ser	Glu	Val	Glu	Gly	Gly	Ala	Gln	Ala	
1355						1360					1365				
acg	ggg	aac	tgt	ttc	tat	gtc	agc	atg	cca	gca	gga	cct	ctg	gac	4149
Thr	Gly	Asn	Cys	Phe	Tyr	Val	Ser	Met	Pro	Ala	Gly	Pro	Leu	Asp	
1370						1375					1380				
tcc	agc	act	gag	cct	act	ggg	aca	ccc	cca	agc	ccc	tca	cag	tgt	4194
Ser	Ser	Thr	Glu	Pro	Thr	Gly	Thr	Pro	Pro	Ser	Pro	Ser	Gln	Cys	
1385						1390					1395				
cac	agc	ctc	cct	gca	tgg	cca	aca	gag	cct	cag	ccc	tac	agg	gga	4239
His	Ser	Leu	Pro	Ala	Trp	Pro	Thr	Glu	Pro	Gln	Pro	Tyr	Arg	Gly	
1400						1405					1410				
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Val	Arg	Gly	Gly	Gln	Cys	Ser	Ser	Leu	Val	Arg	Arg	Asp	Val	Asp	
1415						1420					1425				
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Val	Ile	Phe	His	Thr	Ile	Glu	Gln	Leu	Thr	Ile	Lys	Leu	His	Arg	
1430						1435					1440				
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Leu	Lys	Asp	Met	Glu	Leu	Ala	His	Arg	Glu	Leu	Leu	Lys	Ser	Leu	
1445						1450					1455				
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Gly	Gly	Glu	Ser	Ser	Gly	Gly	Thr	Thr	Pro	Val	Gly	Ser	Phe	His	
1460						1465					1470				
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Thr	Glu	Ala	Ala	Arg	Trp	Thr	Asp	Tyr	Ser	Leu	Ser	Pro	Pro	Ala	
1475						1480					1485				
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Lys	Glu	Ala	Leu	Ala	Ser	Asp	Ser	Gln	Asn	Gly	Gln	Glu	Gln	Gly	
1490						1495					1500				
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Ser	Cys	Pro	Glu	Glu	Gly	Ser	Asp	Ile	Ala	Leu	Glu	Asp	Ser	Ala	
1505						1510					1515				
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Thr	Asp	Thr	Ala	Val	Ser	Pro	Gly								
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Gln Ser His Leu Ser Ser Pro Ile Ala Ser Trp Leu Ser Ser Leu Ser
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35 40 45

Gln Pro Ser Asp Thr Ser Glu Thr Thr Ala Gly Leu Val Gln Arg Cys
50 55 60

Val Ile Ile Gln Lys Asp Gln His Gly Phe Gly Phe Thr Val Ser Gly
65 70 75 80

Asp Arg Ile Val Leu Val Gln Ser Val Arg Pro Gly Gly Ala Ala Met
85 90 95

Lys Ala Gly Val Lys Glu Gly Asp Arg Ile Ile Lys Val Asn Gly Thr
100 105 110

Met Val Thr Asn Ser Ser His Leu Glu Val Val Lys Leu Ile Lys Ser
115 120 125

Gly Ala Tyr Ala Ala Leu Thr Leu Leu Gly Ser Ser Pro Pro Ser Val
130 135 140

Gly Val Ser Gly Leu Gln Gln Asn Pro Ser Val Ala Gly Val Leu Arg
145 150 155 160

Val Asn Pro Ile Ile Pro Pro Pro Pro Pro Pro Pro Leu Pro Pro
165 170 175

Pro Gln His Ile Thr Gly Pro Lys Pro Leu Gln Asp Pro Glu Val Gln
180 185 190

Lys His Ala Thr Gln Ile Leu Trp Asn Met Leu Arg Gln Glu Glu Glu
195 200 205

Glu Leu Gln Asp Ile Leu Pro Pro Cys Gly Glu Thr Ser Gln Arg Thr
210 215 220

Cys Glu Gly Arg Leu Ser Val Asp Ser Gln Glu Ala Asp Ser Gly Leu
225 230 235 240

Asp Ser Gly Thr Glu Arg Phe Pro Ser Ile Ser Glu Ser Leu Met Asn
245 250 255

Arg Asn Ser Val Leu Ser Asp Pro Gly Leu Asp Ser Pro Gln Thr Ser
260 265 270

Pro Val Ile Leu Ala Arg Val Ala Gln His His Arg Arg Gln Gly Ser
275 280 285

Asp Ala Ala Leu Leu Pro Leu Asn His Gln Gly Ile Asp Gln Ser Pro
290 295 300

Lys Pro Leu Ile Ile Gly Pro Glu Glu Asp Tyr Asp Pro Gly Tyr Phe
305 310 315 320

Asn Asn Glu Ser Asp Ile Ile Phe Gln Asp Leu Glu Lys Leu Lys Ser
325 330 335

His Pro Ala Tyr Leu Val Val Phe Leu Arg Tyr Ile Leu Ser Gln Ala
340 345 350

Asp Pro Gly Pro Leu Leu Phe Tyr Leu Cys Ser Glu Val Tyr Gln Gln
355 360 365

Thr Asn Pro Lys Asp Ser Arg Ser Leu Gly Lys Asp Ile Trp Asn Ile
370 375 380

Phe Leu Glu Lys Asn Ala Pro Leu Arg Val Lys Ile Pro Glu Met Leu
385 390 395 400

Gln Ala Glu Ile Asp Leu Arg Leu Arg Asn Asn Glu Asp Pro Arg Asn
405 410 415

Val Leu Cys Glu Ala Gln Glu Ala Val Met Leu Glu Ile Gln Glu Gln
420 425 430

Ile Asn Asp Tyr Arg Ser Lys Arg Thr Leu Gly Leu Gly Ser Leu Tyr
435 440 445

Gly Glu Asn Asp Leu Leu Gly Leu Asp Gly Asp Pro Leu Arg Glu Arg
450 455 460

Gln Met Ala Glu Lys Gln Leu Ala Ala Leu Gly Asp Ile Leu Ser Lys
465 470 475 480

Tyr Glu Glu Asp Arg Ser Ala Pro Met Asp Phe Ala Val Asn Thr Phe
485 490 495

Met Ser His Ala Gly Ile Arg Leu Arg Glu Ser Arg Ser Ser Cys Thr
500 505 510

Ala Glu Lys Thr Gln Ser Ala Pro Asp Lys Asp Lys Trp Leu Pro Phe
515 520 525

Phe Pro Lys Thr Lys Lys Gln Ser Ser Asn Ser Lys Lys Glu Lys Asp
530 535 540

Ala Leu Glu Asp Lys Lys Arg Asn Pro Ile Leu Arg Tyr Ile Gly Lys
545 550 555 560

Pro Lys Ser Ser Ser Gln Ser Ile Lys Pro Gly Asn Val Arg Asn Ile
565 570 575

Ile Gln His Phe Glu Asn Ser His Gln Tyr Asp Val Pro Glu Pro Gly
580 585 590

Thr Gln Arg Leu Ser Thr Gly Ser Phe Pro Glu Asp Leu Leu Glu Ser
595 600 605

Asp Ser Ser Arg Ser Glu Ile Arg Leu Gly Arg Ser Gly Ser Leu Lys
610 615 620

Gly Arg Glu Glu Met Lys Arg Ser Arg Lys Ala Glu Asn Val Pro Arg
625 630 635 640

Pro Arg Ser Asp Val Asp Met Asp Ala Ala Ala Glu Ala Ala Arg Leu
645 650 655

His Gln Ser Ala Ser Ser Ser Ala Ser Ser Leu Ser Thr Arg Ser Leu
660 665 670

Glu Asn Pro Thr Pro Pro Phe Thr Pro Lys Met Gly Arg Arg Ser Ile
675 680 685

Glu Ser Pro Asn Leu Gly Phe Cys Thr Asp Val Ile Leu Pro His Leu
690 695 700

Leu Glu Asp Asp Leu Gly Gln Leu Ser Asp Leu Glu Pro Glu Pro Glu
705 710 715 720

Val Gln Asn Trp Gln His Thr Val Gly Lys Asp Val Val Ala Asn Leu
725 730 735

Thr Gln Arg Glu Ile Asp Arg Gln Glu Val Ile Asn Glu Leu Phe Val
740 745 750

Thr Glu Ala Ser His Leu Arg Thr Leu Arg Val Leu Asp Leu Ile Phe
755 760 765

Tyr Gln Arg Met Arg Lys Glu Asn Leu Met Pro Arg Glu Glu Leu Ala

770

775

780

Arg Leu Phe Pro Asn Leu Pro Glu Leu Ile Glu Ile His Asn Ser Trp
785 790 795 800

Cys Glu Ala Met Lys Lys Leu Arg Glu Glu Gly Pro Ile Ile Arg Asp
805 810 815

Ile Ser Asp Pro Met Leu Ala Arg Phe Asp Gly Pro Ala Arg Glu Glu
820 825 830

Leu Gln Gln Val Ala Ala Gln Phe Cys Ser Tyr Gln Ser Val Ala Leu
835 840 845

Glu Leu Ile Arg Thr Lys Gln Arg Lys Glu Ser Arg Phe Gln Leu Phe
850 855 860

Met Gln Glu Ala Glu Ser His Pro Gln Cys Arg Arg Leu Gln Leu Arg
865 870 875 880

Asp Leu Ile Val Ser Glu Met Gln Arg Leu Thr Lys Tyr Pro Leu Leu
885 890 895

Leu Glu Asn Ile Ile Lys His Thr Glu Gly Gly Thr Ser Glu His Glu
900 905 910

Lys Leu Cys Arg Ala Arg Asp Gln Cys Arg Glu Ile Leu Lys Phe Val
915 920 925

Asn Glu Ala Val Lys Gln Thr Glu Asn Arg His Arg Leu Glu Gly Tyr
930 935 940

Gln Lys Arg Leu Asp Ala Thr Ala Leu Glu Arg Ala Ser Asn Pro Leu
945 950 955 960

Ala Ala Glu Phe Lys Ser Leu Asp Leu Thr Thr Arg Lys Met Ile His
965 970 975

Glu Gly Pro Leu Thr Trp Arg Ile Ser Lys Asp Lys Thr Leu Asp Leu
980 985 990

Gln Val Leu Leu Leu Glu Asp Leu Val Val Leu Leu Gln Arg Gln Glu
995 1000 1005

Glu Arg Leu Leu Leu Lys Cys His Ser Lys Thr Ala Val Gly Ser
1010 1015 1020

Ser Asp Ser Lys Gln Thr Phe Ser Pro Val Leu Lys Leu Asn Ala
1025 1030 1035

Val Leu Ile Arg Ser Val Ala Thr Asp Lys Arg Ala Phe Phe Ile
1040 1045 1050

Ile Cys Thr Ser Glu Leu Gly Pro Pro Gln Ile Tyr Glu Leu Val
1055 1060 1065

Ala Leu Thr Ser Ser Asp Lys Asn Ile Trp Met Glu Leu Leu Glu
1070 1075 1080

Glu Ala Val Gln Asn Ala Thr Lys His Pro Gly Ala Ala Pro Ile
1085 1090 1095

Pro Ile His Pro Ser Pro Pro Gly Ser Gln Glu Pro Ala Tyr Gln
1100 1105 1110

Gly Ser Thr Ser Ser Arg Val Glu Ile Asn Asp Ser Glu Val Tyr
1115 1120 1125

His Thr Glu Lys Glu Pro Lys Lys Leu Pro Glu Gly Pro Gly Pro
1130 1135 1140

Glu Gln Arg Val Gln Asp Lys Gln Leu Ile Ala Gln Gly Glu Pro
1145 1150 1155

Val Gln Glu Glu Asp Glu Glu Glu Leu Arg Thr Leu Pro Arg Ala
1160 1165 1170

Pro Pro Ser Leu Asp Gly Glu Asn Arg Gly Ile Arg Thr Arg Asp
1175 1180 1185

Pro Val Leu Leu Ala Leu Thr Gly Pro Leu Leu Met Glu Gly Leu
1190 1195 1200

Ala Asp Ala Ala Leu Glu Asp Val Glu Asn Leu Arg His Leu Ile
1205 1210 1215

Leu Trp Ser Leu Leu Pro Gly His Thr Val Lys Thr Gln Ala Ala
1220 1225 1230

Gly Glu Pro Glu Asp Asp Leu Thr Pro Thr Pro Ser Val Val Ser
1235 1240 1245

Ile Thr Ser His Pro Trp Asp Pro Gly Ser Pro Gly Gln Ala Pro
1250 1255 1260

Thr Ile Ser Asp Ser Thr Arg Leu Ala Arg Pro Glu Gly Ser Gln
1265 1270 1275

Pro Glu Gly Glu Asp Val Ala Val Ser Ser Leu Ala His Leu Pro
1280 1285 1290

Pro Arg Thr Arg Ser Ser Gly Val Trp Asp Ser Pro Glu Leu Asp
1295 1300 1305

Arg Asn Pro Ala Ala Glu Ala Ala Ser Thr Glu Pro Ala Ala Ser
1310 1315 1320

Tyr Lys Val Val Arg Lys Val Ser Leu Leu Pro Gly Gly Gly Val
1325 1330 1335

Gly Ala Ala Lys Val Ala Gly Ser Asn Ala Ile Pro Asp Ser Gly
1340 1345 1350

Gln Ser Glu Ser Glu Leu Ser Glu Val Glu Gly Gly Ala Gln Ala
1355 1360 1365

Thr Gly Asn Cys Phe Tyr Val Ser Met Pro Ala Gly Pro Leu Asp
1370 1375 1380

Ser Ser Thr Glu Pro Thr Gly Thr Pro Pro Ser Pro Ser Gln Cys
1385 1390 1395

His Ser Leu Pro Ala Trp Pro Thr Glu Pro Gln Pro Tyr Arg Gly
1400 1405 1410

Val Arg Gly Gly Gln Cys Ser Ser Leu Val Arg Arg Asp Val Asp
1415 1420 1425

Val Ile Phe His Thr Ile Glu Gln Leu Thr Ile Lys Leu His Arg
1430 1435 1440

Leu Lys Asp Met Glu Leu Ala His Arg Glu Leu Leu Lys Ser Leu
1445 1450 1455

Gly Gly Glu Ser Ser Gly Gly Thr Thr Pro Val Gly Ser Phe His
1460 1465 1470

Thr Glu Ala Ala Arg Trp Thr Asp Tyr Ser Leu Ser Pro Pro Ala
1475 1480 1485

Lys Glu Ala Leu Ala Ser Asp Ser Gln Asn Gly Gln Glu Gln Gly
1490 1495 1500

Ser Cys Pro Glu Glu Gly Ser Asp Ile Ala Leu Glu Asp Ser Ala
1505 1510 1515

Thr Asp Thr Ala Val Ser Pro Gly Pro
1520 1525

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<212> DNA
<213> *Rattus*

<220>
<221> CDS
<222> (1) .. (564)

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 Met Asp Val Asn Leu Ala Pro Leu Arg Ala Trp Asp Asp Phe Phe Pro
 1 5 10 15

 ggc tct gat cgt ttc gca cg^g ccg gac ttc agg gat ata tcc aaa tgg 96
 Gly Ser Asp Arg Phe Ala Arg Pro Asp Phe Arg Asp Ile Ser Lys Trp
 20 25 30

 aac aac cgt gta gtg agc aat ctg ctc tat tac cag acc aac tac ctg 144
 Asn Asn Arg Val Val Ser Asn Leu Leu Tyr Tyr Gln Thr Asn Tyr Leu
 35 40 45

 gtg gtg gct gcc atg atg att tca gtc gtt ggg ttt ctg agc ccc ttc 192
 Val Val Ala Ala Met Met Ile Ser Val Val Gly Phe Leu Ser Pro Phe
 50 55 60

 aac atg atc ctt gga gga atc att gtg gtg ctg gtg ttc acg ggg ttt 240
 Asn Met Ile Leu Gly Gly Ile Ile Val Val Leu Val Phe Thr Gly Phe
 65 70 75 80

 gtg tgg gca gca cac aat aaa gac atc ctc cgc cgg atg aag aag cag 288
 Val Trp Ala Ala His Asn Lys Asp Ile Leu Arg Arg Met Lys Lys Gln
 85 90 95

 tac cca acg gcc ttt gtc atg gtg gtc atg cta gcc agc tac ttc ctc 336
 Tyr Pro Thr Ala Phe Val Met Val Val Met Leu Ala Ser Tyr Phe Leu
 100 105 110

 ata tcc atg ttt ggg ggt gtc atg gtc ttt gtg ttt ggc atc acg ttt 384
 Ile Ser Met Phe Gly Gly Val Met Val Phe Val Phe Gly Ile Thr Phe
 115 120 125

 ccc tta ttg ttg atg ttc atc cat gca tcc ctg aga ctt cga aac ctc 432
 Pro Leu Leu Leu Met Phe Ile His Ala Ser Leu Arg Leu Arg Asn Leu
 130 135 140

 aag aac aaa ctg gaa aat aaa atg gag gga ata ggc ttg aag aaa acg 480
 Lys Asn Lys Leu Glu Asn Lys Met Glu Gly Ile Gly Leu Lys Lys Thr
 145 150 155 160

 ccg atg ggc atc atc ctg gat gcc ttg gaa cag cag gaa gac agc atc 528
 Pro Met Gly Ile Ile Leu Asp Ala Leu Glu Gln Gln Glu Asp Ser Ile
 165 170 175

 aat aaa ttt gct gac tac atc agc aaa gcc agg gag taa 567
 Asn Lys Phe Ala Asp Tyr Ile Ser Lys Ala Arg Glu
 180 185

<210> 6
<211> 188

<212> PRT
<213> Rattus

<400> 6

Met Asp Val Asn Leu Ala Pro Leu Arg Ala Trp Asp Asp Phe Phe Pro
1 5 10 15

Gly Ser Asp Arg Phe Ala Arg Pro Asp Phe Arg Asp Ile Ser Lys Trp
20 25 30

Asn Asn Arg Val Val Ser Asn Leu Leu Tyr Tyr Gln Thr Asn Tyr Leu
35 40 45

Val Val Ala Ala Met Met Ile Ser Val Val Gly Phe Leu Ser Pro Phe
50 55 60

Asn Met Ile Leu Gly Gly Ile Ile Val Val Leu Val Phe Thr Gly Phe
65 70 75 80

Val Trp Ala Ala His Asn Lys Asp Ile Leu Arg Arg Met Lys Lys Gln
85 90 95

Tyr Pro Thr Ala Phe Val Met Val Val Met Leu Ala Ser Tyr Phe Leu
100 105 110

Ile Ser Met Phe Gly Gly Val Met Val Phe Val Phe Gly Ile Thr Phe
115 120 125

Pro Leu Leu Leu Met Phe Ile His Ala Ser Leu Arg Leu Arg Asn Leu
130 135 140

Lys Asn Lys Leu Glu Asn Lys Met Glu Gly Ile Gly Leu Lys Lys Thr
145 150 155 160

Pro Met Gly Ile Ile Leu Asp Ala Leu Glu Gln Gln Glu Asp Ser Ile
165 170 175

Asn Lys Phe Ala Asp Tyr Ile Ser Lys Ala Arg Glu
180 185

<210> 7
<211> 3111
<212> DNA
<213> Rattus norvegicus

<220>
<221> CDS
<222> (251) .. (452)

<220>
<221> CDS
<222> (584) .. (1869)

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 <222> (251)..(452)

<220>
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 <222> (252)..(451)

<220>
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 gcctggctac tggctgctgc tcaccccgat gctacaagat tccttagcaag atcaaaaactg 120
 accatttaacc tacctctaca tccccctggc gccgttccag ggccaacgcc acattccctg 180
 ctgggcacgc aatggccgca ccccccctcccg ctacagaagg ctcttttgtt acacgcagtc 240
 cgaggtcgcc atg gat cgg atg aag aag atc aaa cgg cag ctg tca atg 289
 Met Asp Arg Met Lys Lys Ile Lys Arg Gln Leu Ser Met
 1 5 10

aca ctc cga ggg ggc cga ggc ata gac aag acc aat ggt gtc cct gag 337
 Thr Leu Arg Gly Gly Arg Ile Asp Lys Thr Asn Gly Val Pro Glu
 15 20 25

cag ata ggc cta gat gag agt ggt ggt ggt ggc atg acc ctt gga 385
 Gln Ile Gly Leu Asp Glu Ser Gly Gly Gly Met Thr Leu Gly
 30 35 40 45

gaa gct ccc acc cgt gtt gcc cct ggg gaa ctt cgc tct att cgg ggc 433
 Glu Ala Pro Thr Arg Val Ala Pro Gly Glu Leu Arg Ser Ile Arg Gly
 50 55 60

cca ctc agc tct gca cca g gtctacctgg gttcccaagt ctgctctagg 482
 Pro Leu Ser Ser Ala Pro
 65

ggccatgtac acaaatggat acgatgaaga aatatattat attggggaa agagagtg 542

cttgactcca aaggcctggc cttccctca ctctgcacca g ag att gtg cat gaa 597
 Glu Ile Val His Glu
 70

gac atg aag atg gga tct gat ggg gag agt gac cag cgt tca gcc aca 645
 Asp Met Lys Met Gly Ser Asp Gly Glu Ser Asp Gln Ala Ser Ala Thr
 75 80 85

tcc tca gat gag gtg cag tct cca gtg aga gtg cgc atg cgc aac cac 693
 Ser Ser Asp Glu Val Gln Ser Pro Val Arg Val Arg Met Arg Asn His
 90 95 100

ccc cca cgc aag atc tcc act gag gat atc aac aaa tgc ctg tca cta 741
 Pro Pro Arg Lys Ile Ser Thr Glu Asp Ile Asn Lys Cys Leu Ser Leu
 105 110 115 120

cca gct gac ata cgg ctg cct gag ggc tac ctt gag aag ctg acc ctc 789
 Pro Ala Asp Ile Arg Leu Pro Glu Gly Tyr Leu Glu Lys Leu Thr Leu
 125 130 135

aat agc ccc atc ggt gat aag cct ctt agc cgg cgc ctc cgg cca gtc 837

Asn Ser Pro Ile Gly Asp Lys Pro Leu Ser Arg Arg Leu Arg Pro Val			
140	145	150	
agc ttg tct gag att ggc ttt gga aaa ctg gag acc tac atc aaa cta			885
Ser Leu Ser Glu Ile Gly Phe Gly Lys Leu Glu Thr Tyr Ile Lys Leu			
155	160	165	
gac aag ctg ggt gag ggt acc tat gcc act gtc tac aaa ggc aaa agc			933
Asp Lys Leu Gly Glu Gly Thr Tyr Ala Thr Val Tyr Lys Gly Lys Ser			
170	175	180	
aag ctc aca gac aac ctt gta gca ctt aag gag atc aga ctg gaa cac			981
Lys Leu Thr Asp Asn Leu Val Ala Leu Lys Glu Ile Arg Leu Glu His			
185	190	195	200
gaa gaa ggg gca ccc tgc act gct atc cg ^g gaa gta tcc ctg ctt aag			1029
Glu Glu Gly Ala Pro Cys Thr Ala Ile Arg Glu Val Ser Leu Leu Lys			
205	210	215	
gac ctc aag cat gcc aac atc gtc aca cta cat gac att atc cac aca			1077
Asp Leu Lys His Ala Asn Ile Val Thr Leu His Asp Ile Ile His Thr			
220	225	230	
gag aag tcc ctc acc ctt gtc ttt gaa tac ttg gac aag gac ctg aag			1125
Glu Lys Ser Leu Thr Leu Val Phe Glu Tyr Leu Asp Lys Asp Leu Lys			
235	240	245	
cag tac ctg gat gac tgt gga aat gtc atc aac atg cac aat gtg aaa			1173
Gln Tyr Leu Asp Asp Cys Gly Asn Val Ile Asn Met His Asn Val Lys			
250	255	260	
ctg ttc ctg ttc cag ttg ctc cgt ggc ctg gcc tac tgc cac agg cag			1221
Leu Phe Leu Phe Gln Leu Leu Arg Gly Leu Ala Tyr Cys His Arg Gln			
265	270	275	280
aag gtg cta cac cga gac ctc aag ccc cag aac cta ctc atc aac gag			1269
Lys Val Leu His Arg Asp Leu Lys Pro Gln Asn Leu Leu Ile Asn Glu			
285	290	295	
agg gga gag ctc aaa ctg gca gac ttt ggc ctg gct tac gcc aag tca			1317
Arg Gly Glu Leu Lys Leu Ala Asp Phe Gly Leu Ala Tyr Ala Lys Ser			
300	305	310	
att cct act aaa aca tac tcc aac gaa gtg gtg aca ctg tgg tac cgg			1365
Ile Pro Thr Lys Thr Tyr Ser Asn Glu Val Val Thr Leu Trp Tyr Arg			
315	320	325	
ccc cct gac atc tta ctt ggg tcc aca gac tac tcc ggc caa att gac			1413
Pro Pro Asp Ile Leu Leu Gly Ser Thr Asp Tyr Ser Gly Gln Ile Asp			
330	335	340	
atg tgg ggt gtt ggc tgc atc ttt tat gag atg gcc aca ggc cgg ccc			1461
Met Trp Gly Val Gly Cys Ile Phe Tyr Glu Met Ala Thr Gly Arg Pro			
345	350	355	360
ctc ttc cca ggc tcc aca gtg gaa cag ctg cac ttc atc ttc cgc			1509
Leu Phe Pro Gly Ser Thr Val Glu Glu Gln Leu His Phe Ile Phe Arg			
365	370	375	
att ttg gga acc cca act gag gac aca tgg cca ggt atc ctg tcc aat			1557
Ile Leu Gly Thr Pro Thr Glu Asp Thr Trp Pro Gly Ile Leu Ser Asn			
380	385	390	
gaa gag ttt aga aca tac aac tac ccc aag tac cga gcc gag gcc ctt			1605
Glu Glu Phe Arg Thr Tyr Asn Tyr Pro Lys Tyr Arg Ala Glu Ala Leu			

aaaaaaaaaa aa

3111

<210> 8
<211> 496
<212> PRT
<213> Rattus norvegicus

<400> 8

Met Asp Arg Met Lys Lys Ile Lys Arg Gln Leu Ser Met Thr Leu Arg
1 5 10 15

Gly Gly Arg Gly Ile Asp Lys Thr Asn Gly Val Pro Glu Gln Ile Gly
20 25 30

Leu Asp Glu Ser Gly Gly Gly Met Thr Leu Gly Glu Ala Pro
35 40 45

Thr Arg Val Ala Pro Gly Glu Leu Arg Ser Ile Arg Gly Pro Leu Ser
50 55 60

Ser Ala Pro Glu Ile Val His Glu Asp Met Lys Met Gly Ser Asp Gly
65 70 75 80

Glu Ser Asp Gln Ala Ser Ala Thr Ser Ser Asp Glu Val Gln Ser Pro
85 90 95

Val Arg Val Arg Met Arg Asn His Pro Pro Arg Lys Ile Ser Thr Glu
100 105 110

Asp Ile Asn Lys Cys Leu Ser Leu Pro Ala Asp Ile Arg Leu Pro Glu
115 120 125

Gly Tyr Leu Glu Lys Leu Thr Leu Asn Ser Pro Ile Gly Asp Lys Pro
130 135 140

Leu Ser Arg Arg Leu Arg Pro Val Ser Leu Ser Glu Ile Gly Phe Gly
145 150 155 160

Lys Leu Glu Thr Tyr Ile Lys Leu Asp Lys Leu Gly Glu Gly Thr Tyr
165 170 175

Ala Thr Val Tyr Lys Gly Lys Ser Lys Leu Thr Asp Asn Leu Val Ala
180 185 190

Leu Lys Glu Ile Arg Leu Glu His Glu Glu Gly Ala Pro Cys Thr Ala
195 200 205

Ile Arg Glu Val Ser Leu Leu Lys Asp Leu Lys His Ala Asn Ile Val
210 215 220

Thr Leu His Asp Ile Ile His Thr Glu Lys Ser Leu Thr Leu Val Phe
225 230 235 240

Glu Tyr Leu Asp Lys Asp Leu Lys Gln Tyr Leu Asp Asp Cys Gly Asn
245 250 255

Val Ile Asn Met His Asn Val Lys Leu Phe Leu Phe Gln Leu Leu Arg
260 265 270

Gly Leu Ala Tyr Cys His Arg Gln Lys Val Leu His Arg Asp Leu Lys
275 280 285

Pro Gln Asn Leu Leu Ile Asn Glu Arg Gly Glu Leu Lys Leu Ala Asp
290 295 300

Phe Gly Leu Ala Tyr Ala Lys Ser Ile Pro Thr Lys Thr Tyr Ser Asn
305 310 315 320

Glu Val Val Thr Leu Trp Tyr Arg Pro Pro Asp Ile Leu Leu Gly Ser
325 330 335

Thr Asp Tyr Ser Gly Gln Ile Asp Met Trp Gly Val Gly Cys Ile Phe
340 345 350

Tyr Glu Met Ala Thr Gly Arg Pro Leu Phe Pro Gly Ser Thr Val Glu
355 360 365

Glu Gln Leu His Phe Ile Phe Arg Ile Leu Gly Thr Pro Thr Glu Asp
370 375 380

Thr Trp Pro Gly Ile Leu Ser Asn Glu Glu Phe Arg Thr Tyr Asn Tyr
385 390 395 400

Pro Lys Tyr Arg Ala Glu Ala Leu Leu Arg His Ala Pro Arg Leu Glu
405 410 415

Cys Asp Gly Ala Asp Leu Leu Thr Lys Leu Leu Gln Phe Glu Gly Arg
420 425 430

Asn Arg Ile Ser Ala Glu Asp Ala Met Lys His Pro Phe Phe Leu Ser
435 440 445

Leu Gly Glu Arg Ile His Lys Leu Pro Asp Thr Thr Ser Ile Phe Ala
450 455 460

Leu Lys Glu Val Gln Leu Gln Lys Glu Ala Asn Ile Arg Ser Thr Ser
465 470 475 480

Met Pro Asp Ser Gly Arg Pro Ala Phe Arg Val Val Asp Thr Glu Phe
485 490 495

<210> 9
<211> 8
<212> PRT
<213> ARTIFICIAL

<220>
<223> EAAT4 peptide fragment

<400> 9

Gln Glu Ala Glu Leu Thr Leu Pro
1 5

<210> 10
<211> 9
<212> PRT
<213> ARTIFICIAL

<220>
<223> EAAT4 peptide fragment

<400> 10

Gly Arg Gly Gly Asn Glu Ser Val Met
1 5

<210> 11
<211> 234
<212> DNA
<213> ARTIFICIAL

<220>
<223> EAAT4COOH BAIT nucleotide

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gaggacatca cattgatcat agctgtggat tggttccttg atcgacttcg tacgatgacc 60
aatgtacttg gggactcaat tggagcagct gtcattgagc atttgtccca acgggagctg 120
gagctgcaag aggctgagct gactctaccc agcctgggaa aaccctataa gtcactcatg 180
gcacaagcca agggggcatc aagggtcg 60 ggaggtaatg agagtgtcat gtga 234

<210> 12
<211> 77
<212> PRT
<213> ARTIFICIAL

<220>
<223> EAAT4COOH BAIT peptide

<400> 12

Glu Asp Ile Thr Leu Ile Ile Ala Val Asp Trp Phe Leu Asp Arg Leu
1 5 10 15

Arg Thr Met Thr Asn Val Leu Gly Asp Ser Ile Gly Ala Ala Val Ile
20 25 30

Glu His Leu Ser Gln Arg Glu Leu Glu Leu Gln Glu Ala Glu Leu Thr
35 40 45

Leu Pro Ser Leu Gly Lys Pro Tyr Lys Ser Leu Met Ala Gln Ala Lys
50 55 60

Gly Ala Ser Arg Gly Arg Gly Gly Asn Glu Ser Val Met
65 70 75

<210> 13
<211> 86
<212> PRT
<213> ARTIFICIAL

<220>
<223> EEAC C-TERM BAIT RAT

<400> 13

Val Asp Trp Leu Leu Asp Arg Phe Arg Thr Met Val Asn Val Leu Gly
1 5 10 15

Asp Ala Phe Gly Thr Gly Ile Val Glu Lys Leu Ser Lys Lys Glu Leu
20 25 30

Glu Gln Val Asp Val Ser Ser Glu Val Asn Ile Val Asn Pro Phe Ala
35 40 45

Leu Glu Pro Thr Ile Leu Asp Asn Glu Asp Ser Asp Thr Lys Lys Ser
50 55 60

Tyr Val Asn Gly Gly Phe Ser Val Asp Lys Ser Asp Thr Ile Ser Phe
65 70 75 80

Thr Gln Thr Ser Gln Phe
85

<210> 14
<211> 14
<212> PRT
<213> ARTIFICIAL

<220>
<223> synthetic peptides representing EEAT4 C-Terminal Ab epitopes

<400> 14

Glu Lys Gly Ala Ser Arg Gly Arg Gly Gly Asn Glu Ser Ala
1 5 10

<210> 15
<211> 16
<212> PRT
<213> ARTIFICIAL

<220>
<223> synthetic peptides representing EEAT4 N-Terminal Ab epitopes

<400> 15

Lys Asn Ser Leu Phe Leu Arg Glu Ser Gly Ala Gly Gly Cys Leu
1 5 10 15

<210> 16
<211> 16

<212> PRT
<213> ARTIFICIAL

<220>
<223> synthetic peptides representing rat GTRAP4-41 Ab epitopes

<400> 16

Lys Arg Gly Pro Ala Pro Ser Pro Met Pro Gln Ser Arg Ser Ser Glu
1 5 10 15

<210> 17
<211> 16
<212> PRT
<213> ARTIFICIAL

<220>
<223> synthetic peptides representing rat GTRAP4-48 Ab epitopes

<400> 17

Lys Thr Pro Glu Arg Thr Ser Pro Ser His His Arg Gln Pro Ser Asp
1 5 10 15

<210> 18
<211> 16
<212> PRT
<213> ARTIFICIAL

<220>
<223> synthetic peptides representing GTRAP3-18 Ab epitopes

<400> 18

Lys Phe Phe Pro Gly Ser Asp Arg Phe Ala Arg Pro Asp Phe Arg Asp
1 5 10 15

<210> 19
<211> 17
<212> DNA
<213> ARTIFICIAL

<220>
<223> GTRAP3-18 sense oligonucleotide

<400> 19
gtgaaccttg cccgctc

17

<210> 20
<211> 18
<212> DNA
<213> ARTIFICIAL

<220>
<223> GTRAP3-18 anti-sense oligonucleotide

<400> 20
gagcggggca aggttcac

18

<210> 21
<211> 6222
<212> DNA
<213> Rattus norvegicus

<220>
<221> CDS
<222> (487)..(1869)

<400> 21
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gcctggctac tggctgctgc tcacacctcgat gctacaagat tccttagcaag atcaaaaactg 120
accattaacc tacctctaca tccccctggc gccgttccag ggccaacgcc acattccctg 180
ctgggcacgc aatggccgca ccccccctcccg ctacagaagg ctcttttgtt acacgcagtc 240
cgaggtcgcc atggatcgga tgaagaagat caaacggcag ctgtcaatga cactccgagg 300
gggcccggc atagacaaga ccaatggtgtt ccctgagcag ataggcctag atgagagtgg 360
tggtgttgtt ggcatgaccc ttggagaagc tcccaccctg gttgcccctg gggaaactcg 420
ctctattcgg ggcccactca gctctgcacc aggtctaccc gggtttccca gtctgctcta 480
ggggcc atg tac aca aat gga tac gat gaa gaa ata tat tat att ggg 528
Met Tyr Thr Asn Gly Tyr Asp Glu Glu Ile Tyr Tyr Ile Gly
1 5 10

gga aag aga gtg ttc ttg act cca aag gcc tgg cct ttc cct cac tct 576
Gly Lys Arg Val Phe Leu Thr Pro Lys Ala Trp Pro Phe Pro His Ser
15 20 25 30

gca cca gag att gtg cat gaa gac atg aag atg gga tct gat ggg gag 624
Ala Pro Glu Ile Val His Glu Asp Met Lys Met Gly Ser Asp Gly Glu
35 40 45

agt gac cag gct tca gcc aca tcc tca gat gag gtg cag tct cca gtg 672
Ser Asp Gln Ala Ser Ala Thr Ser Asp Glu Val Gln Ser Pro Val
50 55 60

aga gtg cgc atg cgc aac cac ccc cca cgc aag atc tcc act gag gat 720
Arg Val Arg Met Arg Asn His Pro Pro Arg Lys Ile Ser Thr Glu Asp
65 70 75

atc aac aaa tgc ctg tca cta cca gct gac ata cgg ctg cct gag ggc 768
Ile Asn Lys Cys Leu Ser Leu Pro Ala Asp Ile Arg Leu Pro Glu Gly
80 85 90

tac ctt gag aag ctg acc ctc aat agc ccc atc ggt gat aag cct ctt 816
Tyr Leu Glu Lys Leu Thr Leu Asn Ser Pro Ile Gly Asp Lys Pro Leu
95 100 105 110

agc cgg cgc ctc cgg cca gtc agc ttg tct gag att ggc ttt gga aaa 864
Ser Arg Arg Leu Arg Pro Val Ser Leu Ser Glu Ile Gly Phe Gly Lys
115 120 125

ctg gag acc tac atc aaa cta gac aag ctg ggt gag ggt acc tat gcc 912
Leu Glu Thr Tyr Ile Lys Leu Asp Lys Leu Gly Glu Gly Thr Tyr Ala
130 135 140

act gtc tac aaa ggc aaa agc aag ctc aca gac aac ctt gta gca ctt 960
Thr Val Tyr Lys Gly Lys Ser Lys Leu Thr Asp Asn Leu Val Ala Leu
145 150 155

aag gag atc aga ctg gaa cac gaa gaa ggg gca ccc tgc act gct atc 1008
Lys Glu Ile Arg Leu Glu His Glu Glu Gly Ala Pro Cys Thr Ala Ile
160 165 170

cg ^g gaa gta tcc ctg ctt aag gac ctc aag cat gcc aac atc gtc aca Arg Glu Val Ser Leu Leu Lys Asp Leu Lys His Ala Asn Ile Val Thr 175 180 185 190	1056
cta cat gac att atc cac aca gag aag tcc ctc acc ctt gtc ttt gaa Leu His Asp Ile Ile His Thr Glu Lys Ser Leu Thr Leu Val Phe Glu 195 200 205	1104
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135

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